

<https://helda.helsinki.fi>

---

## Explaining social-class inequality in voter turnout : the contribution of income and health

Lahtinen, Hannu Antero

2017

---

Lahtinen , H A , Mattila , V M , Wass , H M & Martikainen , P T 2017 , ' Explaining social-class inequality in voter turnout : the contribution of income and health ' , Scandinavian Political Studies , vol. 40 , no. 4 , pp. 388-410 . <https://doi.org/10.1111/1467-9477.12095>

---

<http://hdl.handle.net/10138/302809>

<https://doi.org/10.1111/1467-9477.12095>

---

acceptedVersion

---

*Downloaded from Helda, University of Helsinki institutional repository.*

*This is an electronic reprint of the original article.*

*This reprint may differ from the original in pagination and typographic detail.*

*Please cite the original version.*

Hannu Lahtinen<sup>1</sup>

Mikko Mattila<sup>2</sup>

Hanna Wass<sup>2</sup>

Pekka Martikainen<sup>1,3,4</sup>

# Explaining social class inequality in voter turnout: the contribution of income and health<sup>5</sup>

## Abstract

Occupation-based social class is an important, yet underexplored, factor in electoral participation. We measure social class differences in voter turnout over time and analyze how two other resources, namely income and health, mediate or modify this relationship. The analysis is based on an individual-level register-based 11 per cent sample of the entire electorate in the 1999 Finnish parliamentary elections, and secondarily on smaller register-based samples in 2012 presidential and municipal elections. Results show that income mediates part of the effects of social class on voting, while social class and utilized health indicators exert mainly independent effects on turnout. Social class differences remain largely stable in all income and hospital care groups, except that no differences between classes are observed among those most severely affected by health problems. Results are also mostly similar between those of working age and the older population, between men and women and remain stable over time and in different types of elections. The findings imply that social class should be taken account in theoretical and empirical models of turnout.

This is the peer reviewed version of the following article: Lahtinen, H., Mattila, M., Wass, H., & Martikainen, P. 2017. Explaining Social Class Inequality in Voter Turnout: The Contribution of Income and Health. *Scandinavian Political Studies*, which has been published in final form at <http://onlinelibrary.wiley.com/doi/10.1111/1467-9477.12095/full> This article may be used for non-commercial purposes in accordance with Wiley Terms and Conditions for Self-Archiving.

---

<sup>1</sup> Department of Social Research, University of Helsinki, Finland (for correspondence, please use following e-mail address: [hannu.lahtinen@helsinki.fi](mailto:hannu.lahtinen@helsinki.fi))

<sup>2</sup> Department of Political and Economic Studies, University of Helsinki, Finland

<sup>3</sup> Centre for Health Equity Studies (CHESS), Stockholm University and Karolinska Institutet, Sweden

<sup>4</sup> The Max Planck Institute for Demographic Research, Germany

<sup>5</sup> The study was funded by the Academy of Finland (grant numbers 266844 and 273433)

## Introduction

According to Leighley and Nagler (2013, 23), it has been a “standard analytical approach” in studies of electoral participation during previous decades to use either income or education as an indicator of an individual’s socio-economic position. Interestingly, occupation-based social class is often omitted. In this study, we question this practice by showing that social class robustly stratifies voting propensity between individuals in different Finnish elections.

In addition, the utility of social class in explaining voter turnout remains limited unless we know *how* social class influences participation. In the resource model (Brady et al. 1995), which is the most commonly used framework in studying turnout on individual level (Smets & van Ham 2013), unequal levels of participation between socioeconomic groups can be attributed to unevenly distributed participation-fostering resources. Here, we test the effect of two such resources, namely income and health. Income and health have been chosen since both of them differ substantially between social classes across all countries where reliable data are available (for income, see e.g. Bihagen 2008; Goldthorpe & McKnight 2006; Weeden et al. 2007; for health, see e.g., Kunst & Roskam 2010; Mackenbach et al. 2008; Phelan et al. 2004; Toch-Marquardt et al. 2014) and are known to predict higher voter turnout at least in the democratic high-income countries (for income, see e.g. Kasara & Suryanarayan, 2015; Leighley & Nagler 2013; for health, see e.g. Mattila et al. 2013; Pacheco & Fletcher 2015, Sund et al. 2016).

While it is possible that the effect of social class on turnout is mediated through income and health, it seems equally possible that the relationship between class and turnout varies between citizens in different categories of financial resources, as well as different categories of health. That is, health and income may have a modifying effect on the association between social class and voting. In sum, this study addresses five questions on social class differences in voter turnout: 1) How big are the absolute turnout differences between social classes and does the gap change between 1999 and 2012, between different types of elections or between men and women? 2) To what extent is the association between class and turnout mediated by income? 3) Does this association differ between the poor and the affluent? 4) To what extent is the association between class and turnout mediated by health? 5) Does this association differ between individuals suffering from ill health and individuals with good health?

We also pay attention to age-specific influences between working age and older populations since social class might act differently on people during and after their active working years. Furthermore, the connection between income and social class, as well as health and social class, can vary by age.

The first unique contribution of this study is to assess the social class-income-turnout relationship in a more detailed fashion than has been the case to date. Second, we introduce health in voter turnout studies in a new role, namely, as a resource that can explain socio-economic differences in participation (at least potentially). Third, we are able to use an unusually high quality dataset with an 11 per cent random sample of the entire electorate from the 1999 Finnish parliamentary elections and smaller samples from the 2012 presidential and municipal elections. These data have been linked to individual-level socioeconomic characteristics and health indicators based on personal identity numbers by Statistics Finland. By using actual records instead of self-reported measures, the analysis avoids some of the problems that are common with survey-based data, such as self-selection of respondents and misreporting due to faulty recall or social desirability (Brady et al. 2015; Drivsholm et al. 2006; Karp & Brockington 2005; Moore & Welniak 2000; Sciarini & Goldberg 2016).

### Social class, resources and turnout

In this section, we first discuss what we mean by the concept of social class. Then we discuss the relationship between social class and voter turnout in general. After that, we address two specific factors, i.e. income and health, which we expect to mediate and modify this relationship. Both of them, as well as the overall association, are addressed as different pathways.

A wide range of definitions has been applied to the concept of *social class* in the social science literature, ranging from specific to wide-sweeping characterizations of overall life-chances (see Lareau & Conley 2008, especially chapter 12). Here, we follow a broadly Weberian definition of social class that has become mainstream at least in sociological research on social stratification. Individuals are classified in theoretically meaningful groups on the basis of their (current or former) occupation and their employment relations (for more information, e.g. Goldthorpe 2007, chapter 5). This fairly specific conceptualization aims to capture an individual's place in the economic system by focusing on the social relations in which people earn their living. Furthermore, it should be underlined that social classes are not defined on the basis of self-advocated groups nor communities, but class can act as a factor in explaining social outcomes whether or not individuals are aware of their own class position (Weber [1922] 1968, 929–931, see also Chan & Goldthorpe 2007). Subjective factors such as evaluation of one's own social class position, group identities or class consciousness may act as mechanisms via which social class affects political behavior (Campbell et al. 1960, chapter 13), but the ways that social position and subjective group identities are linked and influence behavior are better treated as empirical questions rather than being assumed *a priori*.

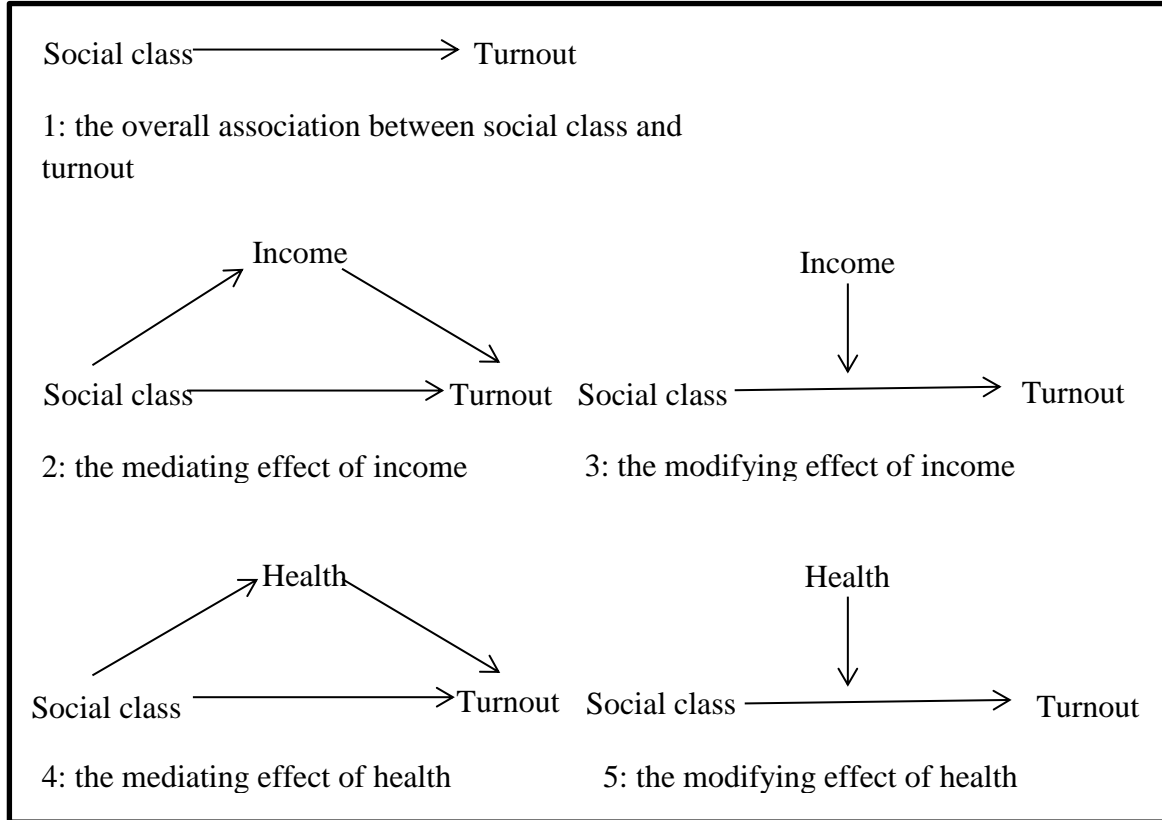
In addition, a wider term in describing an individual's social position is useful. For these purposes, we have used *socio-economic position* as an umbrella concept that can include various indicators, especially education, social class and income.

### **Path 1: class-turnout**

The focus on the effects of an individual's socio-economic position in the research on turnout, as well as the simultaneous absence of social class, is evident in the meta-analysis of studies published between 2000 and 2010 (Smets & van Ham 2013). Among the 90 studies included, education was the most commonly used item. It was used as an independent variable in 67 studies, outnumbering factors such as age (65 studies) and gender (61 studies). Forty studies addressed income, whereas only nine studies used "white collar occupations" as a variable. Leighley and Nagler (2013, 47–49) see this resulting largely from the influential study of the 1972 US elections by Wolfinger and Rosenstone (1980), which concluded that, after adjusting for education, turnout differences between occupational groups could not be predicted by conventional social class models. In addition, the decline or even the death of the social class has been a recurrent theme in the social science literature, which has included claims about its declining political significance (e.g. Clark et al. 1993; for a review, Caínzos & Voces 2010).

To address the first research question (see Figure 1 for illustration), we study the overall social class differences in turnout and the development of these differences from 1999 to 2012. We test whether the alleged decline in the political significance of social class can be seen in the levels of voter turnout. Evidence of this would empirically justify the modest interest in social class paid by the literature on turnout. However, the assumption of decline in the significance of social class has not gained strong empirical support regarding political participation in previous studies (Caínzos & Voces 2010; Manza & Brooks 2008; Martikainen et al. 2005). As Leighely and Nagler (2013, 23) point out, social class (or wider socioeconomic position) is "reflecting the resources and opportunities available to individuals to interact and engage politically, socially, and economically: individuals with higher status have greater resources to assume the costs of such behaviors, and also have more ways to participate in these spheres." In line with this, we expect that members of upper non-manual classes are the most likely voters, followed by lower white collar, self-employed and manual classes and also that *the association between social class and turnout is persistent over time, in different types of elections, and between genders and age groups* (H<sub>1</sub>).

Figure 1. Illustration of our research questions



## Path 2: class–income–turnout

An individual's social class position is linked to income in many ways. The level of income is typically higher among the more skilled and white-collar social classes, as is income stability and the prospects of income development (Bihagen 2008; Goldthorpe & McKnight 2006). High income levels have been found to predict turnout in most of the studies in which income has been taken into account (Smets & van Ham 2013). A lack of financial resources, in turn, can reduce a person's ability to pay attention to politics, as a lot of energy needs to be invested in making a living (Rosenstone 1982, 26). Furthermore, less well-off citizens have fewer opportunities for political recruitment, which has been shown to focus on citizens who possess a higher level of resources (Rosenstone & Hansen 2003, 31–32). Hence, we expect that *the class–turnout association is partly mediated by income* (H<sub>2</sub>).

There is also some evidence indicating that differences in turnout between social classes are larger at the lower end of the income spectrum (Martikainen & Yrjönen 1991), and similar results have been obtained using education instead of social class (Leighley &

Nagler 2013; Wolfinger & Rosenstone 1980;). Within the resource model framework, this could mean that a high social class position grants individuals with certain resources that foster participation, of which income is one. More than that, even if income happens to be scarce, an advantaged social class position can provide other resources, such as civic skills learned on the job, which can compensate for the negative effect of lacking income. It is, therefore, hypothesized that *the class-turnout association is modified by income as it is stronger in low-income and weaker in high-income* (H<sub>3</sub>).

Furthermore, the nature of income differs significantly between working age (wage/salary/entrepreneurial income) and older (pensioned) populations. Although the absolute level of income drops in retirement, the within-age group income rank stays similar throughout this transition. However, the mediating and modifying relations can differ between these age groups. For instance, the work-related mechanisms through which social class influences turnout (Wolfinger & Rosenstone 1980, 22) might no longer be that relevant among pensioners.

### **Path 3: class-health-turnout**

There is a well-known and practically universal relationship between an advantaged social class position and better health outcomes (e.g., Kunst & Roskam 2010; Mackenbach et al. 2008; Toch-Marquardt et al. 2014). Phelan et al. (2004, 265) have argued that an advantaged socio-economic position “embodies an array of resources, such as money, knowledge, prestige, power, and beneficial social connections, that protect health no matter what mechanisms are relevant at any given time”. Furthermore, social class inequalities, which are independent of education and income, might be attributed to factors such as greater work-related security and career prospects, better working conditions, access to influential social networks, and higher power and autonomy in white collar occupations (Kunst & Roskam 2010, 218).

Good self-assessed health (Denny & Doyle 2007a, 2007b; Mattila et al. 2013; Pacheco & Fletcher 2015) has also been shown to be independently associated with electoral participation. Poor health can hamper voting propensity via various mechanisms. These include having a lower level of cognitive resources, sense of efficacy, physical mobility, social connectedness, and a preoccupation with everyday issues which leaves less energy for politics. These mechanisms can be similar to some of those that function with low income. However, our understanding of the interconnections between social class, health and turnout remains limited. The health differences between classes and the fact that good health facilitates voting may imply that health can be one among the mechanisms that explain class differences in voting. We thus hypothesize that *the class-turnout association is partly mediated by health* (H<sub>4</sub>).

As with the case of income, health may also have a modifying effect, but in the opposite direction. Some health-related studies have shown that among people with certain chronic

conditions, socio-economic mortality differences tend to be smaller than among the general population. For example, compared to the rates for the general population, mortality differences between social classes among persons with diabetes are found to be considerably smaller (Forssas et al. 2003). Similarly, protective elements of an advantaged social class regarding mortality are limited after disability retirement (Leinonen et al. 2014; Polvinen et al. 2015). Analogous to these findings, we assume that *the class-turnout association is modified by health, such that it is stronger among citizens with good health and weaker among those with poor health* (H<sub>5</sub>). That is, whereas we expect low income levels to work as an *aggravator* of class differences in turnout, poor health is hypothesized to function as a *leveler*.

Additionally, the effect of health on turnout seems to be stronger among older age groups (Mattila et al. 2013). This opens up the possibility that the mediating and modifying impacts of health would be more pronounced among the older population than among those of working age.

In this study, we use the number of days of hospital care received by an individual as our primary indicator of health, later referred to as days in hospital care. It includes all overnight hospital inpatients, as well as patients receiving daytime surgical operations and specialized outpatient care. As secondary indicators, we also use medicine purchases, sickness allowance days and several health conditions.

## Research design

### Data and study population

The analyses were conducted with individual-level register-based data from Finland. The data set, compiled by Statistics Finland (permission TK-53-339-13), includes an 11 per cent random sample of individuals permanently residing in Finland. Linked together via personal identification numbers from various administrative registers, the data contain information about an individual's sociodemographic factors and information on the use of health care services and medicine purchases. At Statistics Finland, the data set was combined with voting records from the 1999 Finnish parliamentary elections. These are based on unique data compiled by Statistics Finland, which include the entire Finnish electorate. The data are highly reliable, with the non-linkage rate of votes at less than 0.5 per cent (Martikainen et al. 2005). For the purposes of descriptive analysis, the data include samples of voters in the 2012 presidential and municipal elections in those electoral wards that utilized electronic voting registers. These wards included 6.9 and 13.6 per cent of eligible individuals, respectively. Unfortunately, the information on hospital admissions was not available for 2012.

Analyses were conducted separately for working age (30- to 64-year-olds) and older (65-year-olds or older) populations. Setting the minimum age at 30 is based on evidence indicating that around that age, an individual's social class position starts to stabilize



(Härkönen & Bihagen 2011). On the other hand, after the age of 64, a vast majority of the population are pensioners (Kannisto 2014). The final number of cases included in the analysis of the 1999 parliamentary elections was 254,996 for those of working age and 76,968 for the older population. For the 2012 presidential elections, the analysis included 16,018 working-aged and 7,096 older individuals (6.9 per cent of the 11 per cent sample) and for the 2012 municipal elections 33,223 working aged and 13,616 older individuals.

## Methods and modelling

Our analysis followed three phases. First, we tested whether the overall social class differences in turnout have changed since 1999 and whether they vary between different types of elections. This has been done by comparing the turnout between social classes in the 1999 elections to the 2012 presidential and municipal elections using figures based on cross tabulations.

Second, we assessed the extent to which controlling for income and days in hospital care mediate the social class-turnout association. We did not compare nested logistic regression models, since the coefficients between different models are on a different scale (Mood 2010). Instead, we used the approach developed by Karlson, Holm and Breen (the KHB method; Karlson et al. 2012, Breen et al. 2013). The KHB approach extends the decomposition properties of linear path models to logistic models, allowing us to evaluate the amount that income and hospital care mediate the effects of social class on turnout that are not affected by rescaling between models (Breen et al. 2013; Karlson et al. 2012).

In the third set of analyses, the modifying effects of income and hospital care on the class-turnout association were analyzed with interaction effects. For better interpretability of the results, we report estimated turnout probabilities in graphs, holding other variables as observed (Hanmer & Kalkan 2013). All analyses are done with Stata13, mediation analysis by employing the user-written khb-module in it (Kohler et al. 2011).

## Variables

Voting is a dichotomous variable, which indicates whether a person voted or not. Social class is operationalized on the basis of Statistics Finland's socio-economic classification according to occupation. In the first analysis, it includes six categories: 1) upper non-manual, 2) lower non-manual, 3) skilled manual, 4) unskilled manual, 5) self-employed (excluding agricultural occupations) and 6) self-employed in agricultural occupations. For the analysis on 1999 elections, social class was measured at the end of 1995<sup>1</sup>, and for the 2012 elections at the end of 2011. Given the small size of the sixth class, self-employed classes were combined in later analyses. Moreover, skilled and unskilled manual classes were also combined in later analyses to improve the interpretability of the results, since the difference between them was found to be small. For those individuals

who are currently not employed, the previous occupation was used. Five per cent of the working age and three per cent of the older population were excluded from the analysis, as it was not possible to define their respective occupational classes. Most of the individuals in the former group were students. Income is measured based on combined individual taxable gross income for 1996, 1997 and 1998. Taxable income includes income from paid work, investments, pensions and most welfare benefits. In the main mediation analysis, we used a linear measure of income; for the interaction analysis, individuals are ranked into deciles within their age group (30- to 64-year-olds and 65-year-olds or older). This is to capture the possible non-linearity in the associations, as well as to make it more comparable with the days in hospital care measure in the corresponding analysis.

The hospitalization data were acquired from the Finnish Care Register for Healthcare, which has frequently been used in previous health studies. Virtually all discharges can be found in the register, with correct personal identity codes available in more than 99 per cent of all discharges in the late 1990s (Sund 2012). In the main mediation analysis, we used a linear measure for days in hospital care between 1st January 1996 and the election day of 21st March 1999. For the interaction analysis, individuals were categorized into groups, which are again based on deciles within both age groups (30- to 64-year-olds and 65-year-olds or older). As the distribution of the variable is heavily positively skewed (see Table A2), especially in the interaction analysis, the use of a continuous linear measure might give results that look misleadingly strong. We also divided the last decile into percentiles, i.e., 90–94, 95–99 and 99–100, since this is where the turnout rate drops heavily.

Prior studies on the older population show that a large number of days spent in hospital care strongly predicts both all-cause and cause-specific mortality in each of the most important disease groups (Murphy & Martikainen 2013; Nihtilä et al. 2008). In addition, hospital care days is available on a consistent basis for all Finns regardless of employment status or other social characteristics. However, a possible bias in using hospital care episodes as the main health measure could be that access to hospital services may be linked to social class. That is, those in less advantaged socioeconomic positions may seek care less often or have difficulty in obtaining care than those in more advantaged positions. However, the universal welfare system in Finland has been reasonably successful in ensuring equal access in hospital care. During past decades, hospital admissions were distributed across social class strata similarly as mortality and morbidity (Keskimäki et al. 1995). Also around the period of our study, a strong pro-rich bias in Finland regarding general practitioner use has been documented, whereas there has been only a small amount of bias or no bias at all in relation to hospital care relative to need (Keskimäki 2003; Van Doorslaer & Masseria 2004). Furthermore, hospital care use patterns before death are quite similar between educational groups (Martikainen et al. 2012). We thus believe that bias due to differential access is unlikely to be significant in our analysis.

With the exception of the first analysis based on cross tabulation, age, gender, living with a partner, native language and education have been used as individual-level controls in each of our models. Age was added to the models in both linear and squared forms in order to capture its curvilinear effect on turnout, especially among the older population (Bhatti et al. 2012). The first analysis was conducted separately for men and women. However, since major gender differences in social class pattern were not observed, genders were combined for the later analyses. Gender is controlled as a dummy variable with men as the reference category. We also used living with a partner (either married or cohabiting) as a proxy for social connectedness and native language (Finnish/Swedish/other) to measure migration background or belonging to Swedish-speaking minority of the Finnish population.

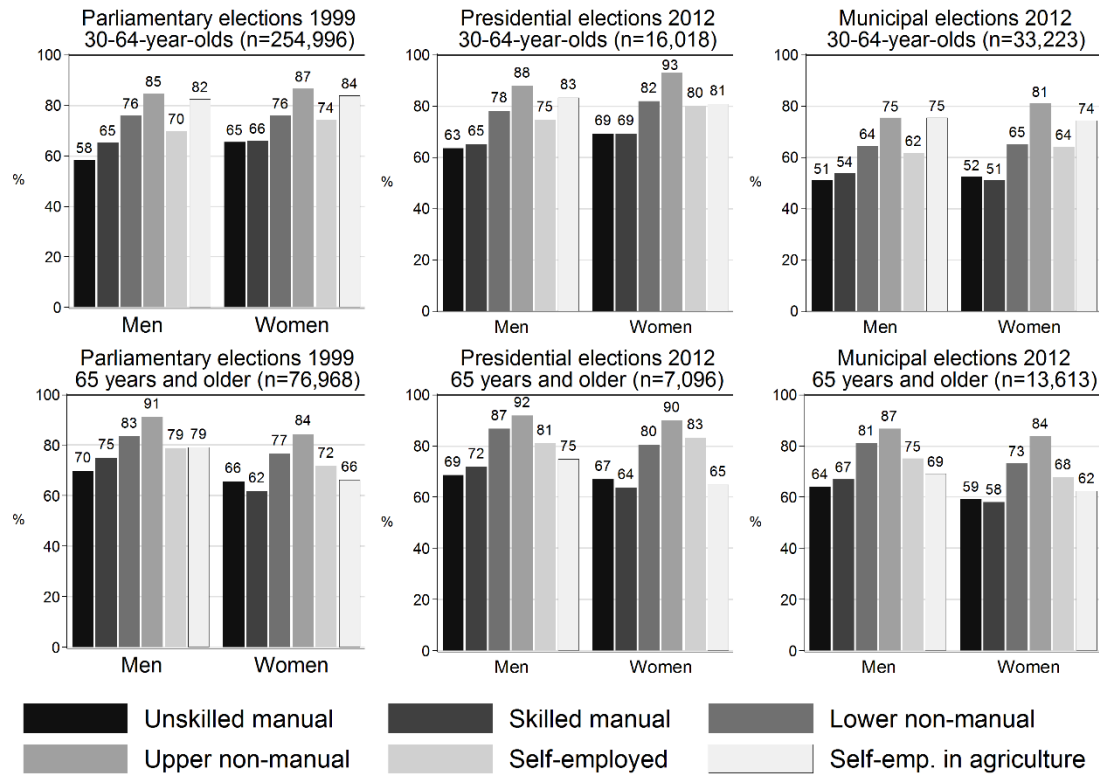
In order to assess the effects of social class and income which cannot be attributed to educational differences, education was also included in our models. It is classified into five groups: 1) lower secondary (maximum nine years of education; in older cohorts, this is often lower), 2) upper secondary (vocational school or academic upper secondary school), 3) lowest tertiary (vocational college education, two to three years after an upper secondary degree), 4) lower degree-level tertiary (three to four years after the upper secondary level, polytechnic or bachelor degree), and 5) higher degree-level tertiary (master's or doctoral level degree). Education, like social class, was measured at the end of 1995. Table A1 in the supplementary information presents distributions and turnout in each group of the variables used.

Each of our variables, including social class and income, is based on an individual's personal position. We argue that individual measures are especially suitable in the Finnish case for both men and women. The Finnish working family culture sees a high proportion of dual-income families, which is evidenced by Finland having the smallest gap between men and women in terms of labor market participation among OECD countries (OECD 2012, 150).

## Results

According to the results presented in Figure 2, hypothesis 1 is supported with only a few reservations. The social classes are placed in clear order among employees. Members of manual classes are the least likely to vote, followed by lower non-manual and upper non-manual classes. The gap between unskilled manual and upper non-manual classes varies between 18 and 29 percentage points. This gradient is strikingly similar in all elections. If any changes can be observed, they suggest a larger class gap in turnout in the 2012 than the 1999 elections among women. In addition, the self-employed outside agricultural occupations are found between skilled manual and lower non-manual classes in each case with only one exception (older women in the 2012 presidential elections).

Figure 2. Turnout by social class and gender in 1999 Finnish parliamentary elections, 2012 presidential elections and 2012 municipal elections in two age groups.



The overall level of voter turnout varies between age groups, but the social class differences again stay similar between them. However, there is one clear exception. Within the self-employed in agricultural occupations, those the older age group are less active voters than those in the younger one, especially in the 2012 elections. Again, the difference is about the same between men and women, but with two exceptions on this occasion. Members of the skilled manual class are slightly more likely to vote than unskilled men, whereas there is no consistent difference among women. Furthermore, in the older age group, self-employed women in agricultural occupations are considerably less likely to vote than men.

As seen in Table 1 (see Tables A5 and A6 in the supplementary information for corresponding analyses with categorical measures of days in hospital care and income),  $H_2$  is clearly supported by the results, which show that income is an important resource explaining social class differences in turnout. Income mediates the social class-related turnout differences from 26 to 42 per cent after controlling for age, age squared, gender, living with a partner, native language and education. The mediation effect is somewhat larger among the older than among the working-aged population. However, the mediation cannot be detected among the self-employed, but instead we observed a suppression effect. An additional analysis with categorical income measurement shows that this suppression can be entirely attributed to the lowest three income deciles (Tables A5 and A6 in the supporting information).

Table 1. Decomposition of total effect of social class (ref. manual) on voting in 1999 parliamentary elections into direct effect and indirect effect, via income and days in hospital care (n: 254,996 for 30- to 64-year-olds; n: 76,968 for those aged 65 years and older). KHB-method.

**30–64-year-olds**

	Lower non-manual		Upper non-manual		Self-employed	
	b	SE	b	SE	b	SE
Total effect	0.32	0.01	0.57	0.02	0.41	0.02
Direct effect	0.24	0.01	0.38	0.02	0.48	0.02
Indirect effect	0.09	0.01	0.19	0.01	-0.07	0.01
via income	0.08	0.002	0.19	0.004	-0.07	0.002
via days in hospital care	0.002	0.0004	0.002	0.0005	0.001	0.0004
<b>Meditation percentages</b>						
Total	26.6		33.8		-16.6	
via income	25.8		33.4		-16.9	
via days in hospital care	0.7		0.4		0.3	

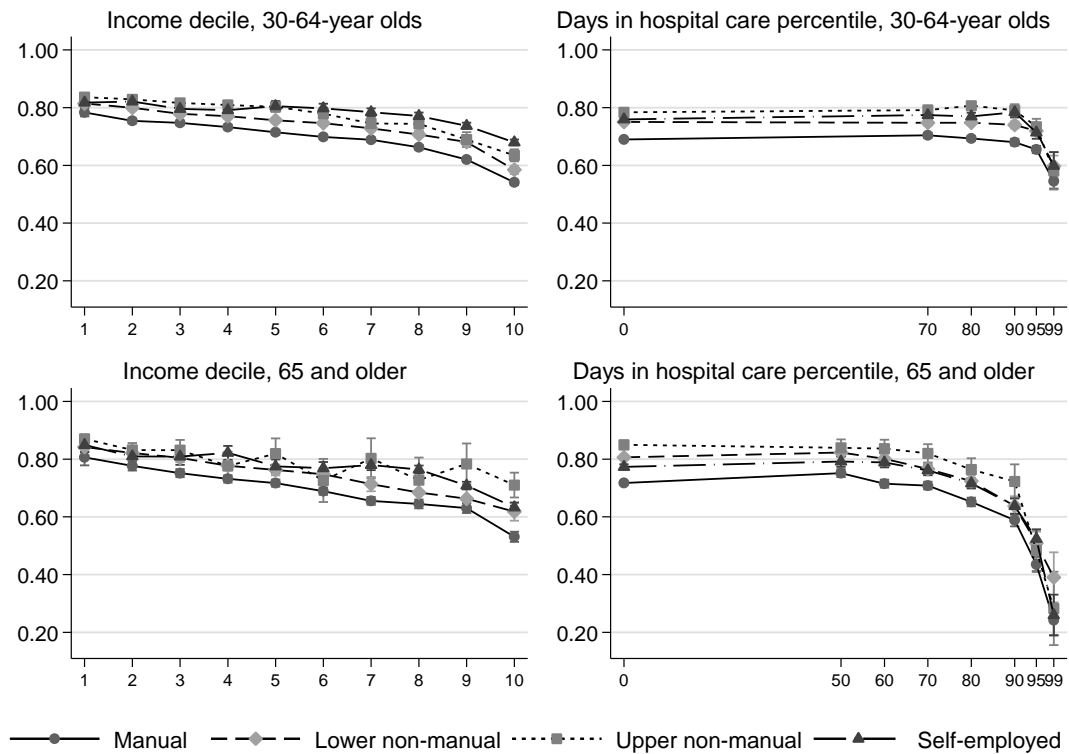
**65-year-olds and older**

	Lower non-manual		Upper non-manual		Self-employed	
	b	SE	b	SE	b	SE
Total effect	0.48	0.02	0.77	0.05	0.32	0.02
Direct effect	0.31	0.02	0.44	0.05	0.40	0.02
Indirect effect	0.17	0.03	0.33	0.03	-0.07	0.03
via income	0.16	0.01	0.33	0.01	-0.07	0.004
via days in hospital care	0.01	0.004	0.01	0.01	-0.001	0.004
<b>Meditation percentages</b>						
Total	36.0		43.4		-22.8	
via income	33.1		42.2		-22.4	
via days in hospital care	2.8		1.2		-0.4	

Note: Models adjusted for education, gender, living with partner, native language, age and age squared.

The results concerning H<sub>3</sub>, suggesting that social class differences would be more pronounced among those with lower incomes, are presented in Figure 3 (left panel), which presents the estimated voting probabilities of different classes in different income deciles. For the highest two deciles, the social class differences are somewhat smaller than they are among the overall population, which fits our hypothesis. At the lower end of the income spectrum, among the working aged the self-employed are less vulnerable to low incomes than those in other types of employment. Among the older population, the upper non-manual class is less vulnerable to lower income levels than other employee classes. Among those of working age, the self-employed are less vulnerable to low incomes than those in other types of employment. Also in this age group, the turnout of self-employed shows weaker association with income than among the employee classes, except for the lowest two deciles, in which the voter turnout of the self-employed drops, too.

Figure 3 Predicted probabilities of voting between classes by income deciles and days in hospital care percentiles. Education, living with a partner, native language, age, age squared and gender as observed.



Although the results concerning the mediation of income ( $H_2$ ) are mostly in line with our expectations, this does not seem to be the case with regard to days in hospital care. Its mediating effect on the class-turnout association is very small among the older population, and almost non-existent among those of working age. Consequently, support for  $H_4$  is very weak.

In the interaction analysis on the right-hand side of Figure 2, the modifying effect of days spent in hospital care on the class-turnout relationships is shown in relation to both age groups. The social class hierarchy stays relatively similar in all hospital care groups up to the 95<sup>th</sup> percentile (12+ days of hospital care among those of working age and 81+ days among the older population; see Table A2), but differences diminish after that. Hence,  $H_5$  receives partial support.

### Sensitivity Analyses

The days in hospital care variable gets value zero for a large proportion of the population and health is a multi-faceted phenomenon. Thus, one could argue that only the very limited mediation that was observed can be attributed to technical issues in measuring health. In order to circumvent these possible limitations, we did additional mediation

analyses that use multiple indicators of health. Health indicators used are the amount of medicine purchased between January 1, 1996 and March 21, 1999 and the cost of them. In addition, for working-age population, we used number of days in (long-term<sup>2</sup>) sickness allowance during the same period. Finally, we identify 13 different health conditions – namely, arterial hypertension, coronary artery disease, atrial fibrillation, cardiac insufficiency, diabetes mellitus, atherosclerosis, cancer, chronic obstructive pulmonary disease / asthma, dementia, depression, Parkinson's disease, mental disorders and renal insufficiency – based on the criterion by Peltola et al. (2011).<sup>3</sup> For distributions of these variables, see Tables A3 and A4 in the supplementary information.

Including all these indicators of health increases the mediation marginally. When all 17 were combined among the working-aged, the mediation was 2.0 per cent for lower non-manual, 1.4 per cent for upper non-manual and 1.4 per cent for self-employed (Table A7 in the supplementary information). For the older population, after combining all 16 indicators, corresponding mediations were 4.8 per cent for lower non-manual, 3.0 per cent for upper-non manual and 0.0 per cent for self-employed (Table A8 in the supplementary information). Thus, we can conclude that even after including a large number of health indicators, observed mediation remains marginal.

## Discussion

### Main Findings

This study analyzed the occupation-based social class differences in voter turnout in three Finnish elections (1999 parliamentary elections, 2012 presidential elections and 2012 municipal elections). We also tested the importance of two potential mechanisms, namely the extent to which income and days spent in hospital care mediated and modified the relationship between social class and turnout in the 1999 Finnish parliamentary elections. Table 2 summarizes the success of our hypotheses.

Table 2. Success of research hypotheses.

No.	Description: <i>association between social class and turnout is...</i>	Success
H <sub>1</sub>	<i>Persistent over time, in different elections, and between genders and age groups</i>	Clear
H <sub>2</sub>	<i>Partly mediated by income</i>	Clear
H <sub>3</sub>	<i>Stronger among low-income citizens, weaker among high-income citizens</i>	Partial
H <sub>4</sub>	<i>Partly mediated by health</i>	Very weak
H <sub>5</sub>	<i>Stronger among citizens with good health, weaker among citizens with poor health</i>	Partial

Our results are in line with Caínzos and Voces (2010) and Martikainen et al. (2005) in stressing the importance of social class as a predictor of electoral participation. The gap in turnout between social classes showed no sign of declining over time. Rather, it was quite similar for all three elections studied. This is particularly interesting given that the types of elections are different; presidential and legislative elections are considered to be first-order and municipal elections second-order contests in Finland. In addition, overall differences in turnout between presidential and legislative elections have also been small in international comparison (Martinez i Coma 2016).

One interesting observation is the similarity of the main effects in both age groups. Even though social class was defined on the basis of an individual's occupational position, it was an equal, or even a slightly stronger, predictor of turnout in the older, mostly retired, age group than in the younger one. An additional analysis (not shown here) indicates that this is largely attributable to the fact that education explains a larger share of the turnout gap among those of working age and this was also the case in the 2012 elections. The age-related stability of social class differences in turnout are in line with an earlier study using a more limited age span (Martikainen et al. 2005), and this contrasts with the age variability of education and income as determinants of turnout (Martikainen et al. 2005; Rubenson et al. 2004).

Between 26 and 42 per cent of the association between social class and turnout among employee classes can be attributed to income, which is a relatively large contribution in the mediation analysis in the social sciences. Despite this, the majority of the social class-turnout association cannot be captured with income. This is not surprising since there are a large number of other potential mechanisms explaining turnout differences associated with social class, such as civic skills, political efficacy, social networks and political trust (for discussion, Lahtinen et al. 2017). These factors were not observed in our register-based study.

As an exception to the general pattern, income does not mediate the difference between the manual class and the self-employed but the difference was accentuated after taking income in to account. In terms of income, the self-employed are a heterogeneous group consisting of both low and high income people. Thus, the self-employed seem to form a relevant group in political behavior that would not be captured in electoral studies without including social class among the measures of socioeconomic position.

Days in hospital care, in turn, mediate only a negligible part of the association between social class and turnout. Although having a large number of days in hospital care is strongly connected to low turnout, and differences in hospital care between classes exist, the proportion of the population with serious health problems is too small to explain a substantial proportion of the social class differences in voter turnout. As including a large number of other health indicators did not increase the mediation substantially, we conclude that, at the level of the overall population, our analysis does not indicate that health inequality explains social class inequality in turnout to a significant extent.<sup>4</sup> On the



other hand, among those few people with very serious health problems, social class does not make a difference. According to Lyman (1856), Publilius Syrus wrote 1<sup>st</sup> century 100 BC, “As men, we are all equal in the presence of death”. This also seems to apply to turnout differences among the most sick.

### **Methodological considerations**

The register-based data used in this study have obvious strengths, such as objectivity, accuracy and a large sample size. We have thus avoided some of the problems that plague more commonly used survey-based analyses, such as self-selection of the respondents, memory failures and social desirability bias.

As always in the case of single-country studies, the generalizability of the results to other country-contexts is a question. In Finland, the social class gap in turnout is average in the European comparison (Caínzos & Voces 2010), and somewhat elevated in comparison to other Nordic countries (Bengtsson et al. 2014). Because both social class inequalities in income and health as well as turnout inequalities in income and health are shown to be robust across Western democracies, we expect our main findings to hold in other contexts as well. However, further empirical studies in a comparative setting are needed.

Finally, in addition to mediation, there might be also interactions related to, for example, some specific health conditions that our catch-all strategy by using only a generic indicator of health, namely days in hospital care, is unable to capture. However, testing these interactions offer almost endless options, and will be thus be left for future studies with more specific focus on certain conditions.

### **Concluding remarks**

We finish by discussing the possible benefits of including social class in the models of voter turnout for future studies. First, we argue that there is a need for a more nuanced decomposition of an individual’s socio-economic position. In disciplines such as developmental psychology, sociology and social epidemiology, the use of several socio-economic indicators has evolved into an established practice in the last few decades (e.g. Bradley & Corwyn 2002; Bukodi & Goldthorpe 2013; Ensminger & Bradley 2003; Erikson 2016; Erola et al. 2016; Geyer et al. 2006; Lahelma et al. 2004). In contrast, this is not the case in the studies of political participation, as social class is often missing. However, our analysis has shown that the contribution of social class in predicting turnout is persistent over time and essentially similar among working age and older populations, as well as for men and women. Furthermore, social class remained as an independent component in explaining turnout after controlling for education and income. This implies that different socio-economic factors trail partly different pathways in producing inequality also in voter turnout. Thus, the efforts to find a single best measure (or even two measures) of socio-economic position is a suboptimal approach. In our results, this

was demonstrated perhaps most clearly by the distinctive behavior of self-employed individuals, which cannot be captured by relying solely on education and income. There may be even other income-related mechanisms which social class captures while the direct measure income does not. In addition to the amount of money earned, positions of individuals regarding many relevant policies may differ depending on their source of income, i.e. whether it consists of wages, salaries, entrepreneurial income or government benefits.<sup>5</sup>

Second, social class can offer new prospects in understanding the intergenerational and life-course effects in turnout. As pointed out by Brady et al. (2015), research on the intergenerational reproduction of political behavior between parents and their offspring has been rather narrowly focused, as it has mainly relied on political socialization (i.e., cultural and psychological factors). In order to gain a deeper understanding of aspects such as intergenerational transmission of material resources and social networks, the authors recommend adopting strategies that are commonly used in the sociological literature on social stratification. Social class, being the core concept of sociological research on the intergenerational transmission of an individual's social position (Erikson & Goldthorpe 2002), can turn out to be an important tool in this research program.

Third, studying the effect of social class on turnout has field-specific relevance in political science, since political action has traditionally had an explicit relationship with social class. There have been claims of the declining political significance of social class (for reviews, see Caínzos & Voces 2010; Evans, 1999). The leading argument has been the decline of class voting, that is, whether members of the working class and the middle class will vote for distinct parties (Clark et al. 1993). However, even if class voting is in decline (which is also debatable; see Evans 1999, Manza & Brooks 2008), it might well be because members of the working class have moved from being left-wing voters to becoming non-voters (for corresponding arguments, see Gattig 2006; Goldthorpe 2002).

Fourth, the resource model of political participation (Brady et al. 1995), could also be strengthened by the inclusion of social class. In their original work, Brady et al. (1995) identified three resources that were important in accounting for participation differences between socioeconomic groups, namely time, money and skills, and followed the common practice in the field by measuring socio-economic position primarily by education. However, we argue that social class might actually be a more fruitful measure to link money and skills to individuals' social standing, as it is more proximate to both of them. In the analysis of Brady et al. (1995), the type of skills that made the difference between educational groups were job skills. Job skills, however, can be measured more directly on the basis of social class than education, since individuals' class positions are closely related (usually even by definition) to the skill intensity of their occupation (e.g., Goldthorpe 2007, 105–124; Wolfinger & Rosenstone 1980).<sup>6</sup> Money is also more closely related to social class than education. Occupation is the main pathway on how education improves the income of an individual (Erola et al. 2016).

However, although important, it should be noted that resource-based investigations also have their limits and are likely to offer only a partial explanation of the social class differences in participation. There are probably some traits contributing on these differences that are very hard (e.g. cognitive potential, Denny & Doyle 2008), and/or not necessarily even desirable to manipulate (e.g. personality characteristics, Denny & Doyle 2008). Although the social class gap in turnout is thus unlikely to disappear completely, at least not without extremely radical societal changes, its size is nevertheless far from constant across contexts. Following Laurison (2016), future studies should also pay attention to the institutional and relational mechanisms that contribute to the social class differences in voter turnout. Institutional mechanisms include, for example, factors within the party system (e.g. differing mobilization attempts targeted at individuals in different social classes) that create inclusion of certain groups and exclusion of others. Relational mechanisms include formal and informal social networks where participation is encouraged, as well as the sense of being a legitimate political participant in the society.

## Endnotes

---

<sup>1</sup> Before 2005, social class was updated in the Finnish Census only after intervals of five years

<sup>2</sup> In Finland, state-paid sickness allowances are available for employees, the self-employed, unemployed and students for those sickness episodes that last over ten days. Therefore, a ten-day waiting period has to be added to these numbers as they are not found in official registers. However, long-term sickness absences are a more valid health indicator than also including shorter spells in the measure (e.g. Kivimäki et al. 2003)

<sup>3</sup> We specify these conditions if an individual was treated or diagnosed with a referred disease in hospitals or purchased prescribed medicines between January 1, 1996 and March 21, 1999 or if he/she had a valid reimbursement right for corresponding medicines on the election day March 21, 1999

<sup>4</sup> On the other hand, a strong overall association between days in hospital care and turnout (see Figure 3 and Table A1) give support to the claims that health should be taken seriously as a resource in electoral participation (e.g. Pacheco and Fletcher 2015).

<sup>5</sup> Future studies could complement this measurement by including variables such as current labour force participation or employment in public/private sector

<sup>6</sup> Brady et al. (1995, 276) also acknowledge the importance of social class in relation to job skills, although they discuss it only briefly.

## References

Bengtsson, Å., Hansen, K., Harðarson, Ó. Þ., Narud, H. M., & Oscarsson, H. 2013. The Nordic voter: myths of exceptionalism. Colchester: ECPR Press.

Bhatti, Y, Hansen, K.M. & Wass, H. 2012. 'The relationship between age and turnout: a roller-coaster ride', *Electoral Studies* 31(3), 588-593.

Bihagen, E. 2008. 'Does class matter equally for men and women? A study of the impact of class on wage growth in Sweden 1999–2003', *Sociology* 42(3), 522–540.

Bradley, R.H. & Corwyn, R. F. 2002. 'Socioeconomic status and child development', *Annual Review of Psychology* 53(1), 371–399.

Brady, H.E., Schlozman, K. L. & Verba, S. 2015. 'Political mobility and political reproduction from generation to generation', *The ANNALS of the American Academy of Political and Social Science* 657(1), 149–173.

Brady, H. E., Verba, S. & Schlozman, K. L. 1995. 'Beyond SES: a resource model of political participation', *American Political Science Review* 89(2), 271–294.

Breen, R., Karlson, K. B. & Holm, A. 2013. 'Total, direct, and indirect effects in logit and probit models', *Sociological Methods & Research* 42(2), 164–191.

Bukodi, E., & Goldthorpe, J.H. 2013. 'Decomposing "social origins": the effects of parents' class, status, and education on the educational attainment of their children', *European Sociological Review*, 29(5), 1024–1039.

Caínzos, M., & Voces, C. 2010. 'Class inequalities in political participation and the 'death of class' debate', *International Sociology*, 25(3), 383–418.

Campbell, A., Converse, P. E., Miller, W. E., & Stokes, D. E. 1960. The American voter. New York: Wiley & Sons.

Chan, T. W., & Goldthorpe, J. H. 2007. 'Class and status: The conceptual distinction and its empirical relevance', *American Sociological Review*, 72(4), 512–532.

Clark, T. N., Lipset, S. M., & Rempel, M. 1993. 'The declining political significance of social class', *International Sociology*, 8(3), 293–316.

Denny, K. J. & Doyle, O. M. 2007a. 'Analysing the relationship between voter turnout and health in Ireland', *Irish Medical Journal* 100(8), suppl 56–58.

Denny, K. J & Doyle, O. M. 2007b. "'...Take up thy bed, and vote". Measuring the relationship between voting behaviour and indicators of health', *European Journal of Public Health* 17(4), 400–401.

Denny, K., & Doyle, O. 2008. 'Political interest, cognitive ability and personality: Determinants of voter turnout in Britain', *British Journal of Political Science*, 38(2), 291-310.

Drivsholm, T., Eplov, L. F., Davidsen, M., Jørgensen, T., Ibsen, H., Hollnagel, H., & Borch-Johnsen, K. 2006. 'Representativeness in population-based studies: a detailed description of non-response in a Danish cohort study', *Scandinavian Journal of Public Health*, 34(6), 623-631.

Ensminger, M. & Bradley, R.H. 2003. 'A decade of measuring SES: What it tells us and where to go from here?', in Bornstein, M. H. & Fothergill K. eds., *Socioeconomic status, parenting, and child development*. New York: Routledge.

Erikson, R. 2016. 'Is it enough to be bright? Parental background, cognitive ability and educational attainment', *European Societies*, 18(2), 117-135.

Erikson, R. & Goldthorpe, J.H., 2002. 'Intergenerational inequality: a sociological perspective', *The Journal of Economic Perspectives* 16 (3), 31-44.

Erola, J., Jalonen, S. & Lehti, H. 2016. 'Parental education, class and income over early life course and children's achievement', *Research in Social Stratification and Mobility*, 44, 33-43

Evans, G. 1999. *The end of class politics? Class voting in comparative context*. Oxford: University Press.

Forssas, E., Keskimäki, I. & Reunanen, A., and Koskinen, S. 2003. 'Widening socioeconomic mortality disparity among diabetic people in Finland', *European Journal of Public Health*, 13(1), 38-43.

Geyer, S., Hemström, Ö., Peter, R. & Vågerö, D. 2006. 'Education, income, and occupational class cannot be used interchangeably in social epidemiology. Empirical evidence against a common practice', *Journal of Epidemiology and Community Health* 60(9), 804-810.

Gattig, A. 2006. 'Klasseneinflüsse auf das Wahlverhalten und die Wahlbeteiligung', *Kölner Zeitschrift für Soziologie und Sozialpsychologie*, 58(3), 510-533.

Goldthorpe, J. H. 2002. 'Globalisation and social class', *West European Politics*, 25(3), 1-28.

Goldthorpe, J.H. 2007. *On Sociology, second edition: volume two: illustration and retrospect*. Stanford: Stanford University Press.

Goldthorpe, J. H. & McKnight, A. 2006. 'The economic basis of social class', in S.L. Morgan, D. Grusky, B. & Fields, G.S., eds., *Mobility and inequality: frontiers of research in sociology and economics*. Stanford: University press.

Hanmer, M.J., & Kalkan K.O. 2013. 'Behind the curve: clarifying the best approach to calculating predicted probabilities and marginal effects from limited dependent variable models', *American Journal of Political Science* 57(1), 263–277.

Härkönen, J., & Bihagen, E. 2011. 'Occupational Attainment and Career Progression in Sweden', *European Societies*, 13(3), 451–479.

Kannisto, J. 2014. Effective retirement age in the Finnish earnings-related pension scheme. Helsinki: Finnish Centre for Pensions.

Karlson, K., Holm, A. & Breen, R. 2012. 'Comparing regression coefficients between same-sample nested models using logit and probit: a new method', *Sociological Methodology*, 42(1), 286–313.

Karp, J. A., & Brockington, D. 2005. 'Social desirability and response validity: A comparative analysis of overreporting voter turnout in five countries', *Journal of Politics*, 67(3), 825–840.

Kasara, K., & Suryanarayan, P. 2015. 'When do the rich vote less than the poor and why? Explaining turnout inequality across the world', *American Journal of Political Science*, 59(3), 613–627.

Kivimäki, M., Head, J., Ferrie, J.E., Shipley, M.J. & Marmot, M.G. 2003. 'Sickness absence as a global measure of health: evidence from mortality in the Whitehall II prospective cohort study', *BMJ (Clinical research ed.)* 327(7411), 364.

Kohler, U., Karlson, K. & Holm, A. 2011. 'Comparing coefficients of nested nonlinear probability models', *Stata Journal* 11(3), 420–438.

Keskimäki, I. 2003. 'How did Finland's economic recession in the early 1990s affect socio-economic equity in the use of hospital care?', *Social Science & Medicine*, 56(7), 1517–1530.

Keskimäki, I., Salinto, M., & Aro, S. 1995. 'Socioeconomic equity in Finnish hospital care in relation to need'. *Social Science & Medicine*, 41(3), 425–431.

Kunst, A. E., & Roskam, A.-J. R. 2010. 'Using the ESeC to describe socio-economic inequalities in health in Europe', in Rose, D. & Harrison, E. eds., *Social class in Europe : an introduction to the European socio-economic classification*. London: Routledge.

Lahelma, E., Martikainen, P., Laaksonen, M. & Aittomäki, A. 2004. 'Pathways between socioeconomic determinants of health', *Journal of Epidemiology and Community Health* 58(4), 327–332.

Lahtinen, H., Wass, H., & Hiilamo, H. 2017. 'Gradient constraint in voting: The effect of intra-generational social class and income mobility on turnout', *Electoral Studies*, 45, 14–23.

Lareau, A., & Conley, D. 2008. *Social class: How does it work?* New York: Russell Sage Foundation.

- Laurison, D. 2016. 'Social class and political engagement in the United States', *Sociology Compass*, 10(8), 684-697.
- Leighley, J. E. & Nagler, J. 2013. Who votes now? Demographics, issues, inequality, and turnout in the United States. Princeton: Princeton University Press.
- Leinonen, T., Martikainen, P., Laaksonen, M. & Lahelma, E. 2014. Excess mortality after disability retirement due to mental disorders: variations by socio-demographic factors and causes of death. *Social Psychiatry and Psychiatric Epidemiology* 49(4), 639-649.
- Lyman, D. 1856. The moral sayings of Publius Syrus, a Roman slave: From the Latin. Boston: L.E. Barnard & co.
- Mackenbach, J.P., Stirbu, I., Roskam, A.-J.R., Schaap, M.M., Menvielle, G., Leinsalu, M., & Kunst, A.E. 2008. 'Socioeconomic inequalities in health in 22 European countries', *New England Journal of Medicine* 358(23), 2468-2481.
- Manza, J., & Brooks, C. 2008. 'Class and Politics'. In Lareau, A. & Conley, D., eds., *Social class. How does it work?* New York: Russel Sage Foundation.
- Martikainen, P., Martikainen, T. & Wass, H. 2005. 'The effect of socioeconomic factors on voter turnout in Finland: a register-based study of 2.9 million voters', *European Journal of Political Research* 44(5), 645-669.
- Martikainen, P., Murphy, M., Metsä-Simola, N., Häkkinen, U., & Moustgaard, H. 2012. 'Seven-year hospital and nursing home care use according to age and proximity to death: variations by cause of death and socio-demographic position', *Journal of Epidemiology and Community Health*, 66(12), 1152-1158.
- Martikainen, T. & Yrjönen, R. 1991. Voting, parties and social change in Finland. Helsinki: Statistics Finland.
- Martinez i Coma, F. 2016. 'Turnout determinants in democracies and in non-democracies', *Electoral Studies*, 41, 50-59.
- Mattila, M., Söderlund, P., Wass, H. & Rapeli, L. 2013. 'Healthy voting: the effect of self-reported health on turnout in 30 countries', *Electoral Studies* 32(4), 886-891.
- Mood, C. 2010. 'Logistic regression: Why we cannot do what we think we can do, and what we can do about it', *European Sociological Review*, 26(1), 67-82.
- Moore, J. C., & Welniak, E. J. 2000. 'Income measurement error in surveys: A review', *Journal of Official Statistics*, 16(4), 331-361.
- Murphy, M. & Martikainen, P. 2013. 'Use of hospital and long-term institutional care services in relation to proximity to death among older people in Finland', *Social Science & Medicine*, 88, 39-47.

Nihtilä, E. K., Martikainen, P. T., Koskinen, S. V. P., Reunanen, A. R., Noro, A. M., & Häkkinen, U. T. 2008. 'Chronic conditions and the risk of long-term institutionalization among older people', *The European Journal of Public Health*, 18(1), 77–84.

OECD. 2012. *Closing the Gender Gap: Act Now*. OECD Publishing.

Pacheco, J. & Fletcher, J. 2015. 'Incorporating health into studies of political behavior Evidence for Turnout and Partisanship', *Political Research Quarterly*, 68(1), 104–116.

Peltola, M., Juntunen, M., Häkkinen, U., Rosenqvist, G., Seppälä, T. T., & Sund, R. 2011. 'A methodological approach for register-based evaluation of cost and outcomes in health care', *Annals of Medicine*, 43(sup1), S4-S13.

Phelan, J. C., Link, B. G., Diez-Roux, A., Kawachi, I. & Levin, B. 2004. "Fundamental causes" of social inequalities in mortality: a test of the theory', *Journal of health and social behavior*, 45(3), 265-285.

Polvinen, A., Laaksonen, M., Gould, R., Lahelma, E., Leinonen, T. & Martikainen, P. 2015. 'Socioeconomic inequalities in cause-specific mortality after disability retirement due to different diseases', *Scandinavian Journal of Public Health*, 43(2), 159–168.

Rosenstone, S. J. 1982. 'Economic adversity and voter turnout', *American Journal of Political Science*, 26(1), 25–46.

Rosenstone, S. J. and Hansen, J. M. 2003. *Mobilization, participation and democracy in America*. New York: Longman.

Rubenson, D., Blais, A., Fournier, P., Gidengil, E. & Nevitte, N. 2004. 'Accounting for the age gap in turnout', *Acta Politica* 39(4), 407–421.

Sciarini, P., & Goldberg, A. C. 2016. 'Turnout bias in postelection surveys: political involvement, survey participation, and vote overreporting', *Journal of Survey Statistics and Methodology*, smv039.

Smets, K. & van Ham, C. 2013. 'The embarrassment of riches? A meta-analysis of individual-level research on voter turnout', *Electoral Studies* 32(2), 344–359.

Sund, R. 2012. 'Quality of the Finnish Hospital Discharge Register: A systematic review', *Scandinavian Journal of Public Health*, 40(6), 505–515.

Sund, R., Lahtinen H., Wass H., Mattila, M. & Martikainen, P. 2016. 'How voter turnout varies between different chronic conditions? A population-based register study', *Journal of Epidemiology and Community Health*, jech–2016.

Toch-Marquardt, M., Menvielle, G., Eikemo, T. A., Kulhánová, I., Kulik, M. C., Bopp, M., Jasilionis, D., Mäki, N., Martikainen, P., Regidor, E., Lundberg, O., Mackenbach, J.P. & Regidor, E. 2014. 'Occupational class inequalities in all-cause and cause-specific mortality among middle-aged men in 14 European populations during the early 2000s', *PloS one*, 9(9), e108072.



Van Doorslaer, E., & Masseria, C. 2004. 'Income-related inequality in the use of medical care in 21 OECD countries', in, The OECD health project. Towards high-performing health systems'. Paris: OECD.

Weber, M. [1922] 1968. *Economy and Society : An Outline of Interpretive Sociology*. New York: Bedminster press.

Weeden, K. A., Kim, Y.-M., Di Carlo, M., & Grusky, D. B. 2007. 'Social class and earnings inequality', *American Behavioral Scientist*, 50(5), 702–736.

Wolfinger, R. E. & Rosenstone, S. J. 1980. *Who votes?* New Haven, CT: Yale University Press.

## Supporting information

Table A1. Distributions of variables and turnout in 1999 Finnish parliamentary elections by age group.

	30-64-year-olds		65-year-olds or more	
	%	turnout (%)	%	turnout (%)
<b>Education</b>				
Comprehensive	33	66	76	69
Upper secondary	39	70	14	80
Lowest tertiary	16	81	5	86
Lower tertiary	6	87	3	89
Upper tertiary	7	89	2	92
Total	100		100	
<b>Social class</b>				
Unskilled manual	17	62	23	67
Skilled manual	21	65	22	68
Lower non-manual	33	76	22	78
Upper non-manual	16	86	9	88
Self-employed outside agricultural occupations	8	71	6	75
Self-employed in agricultural occupations	6	83	18	71
Total	100		100	
<b>Income decile</b>				
Highest decile	10	87	10	89
2nd decile	10	81	10	83
3rd decile	10	78	10	80
4th decile	10	76	10	77
5th decile	10	74	10	73
6th decile	10	72	10	71
7th decile	10	72	10	69
8th decile	10	69	10	67
9th decile	10	65	10	64
Lowest decile	10	54	10	55
Total	100		100	
<b>Days in hospital care percentile</b>			0	
0	68	73	47	78
50			10	79
60			11	77
70	9	74	11	73
80	12	74	10	66
90	5	73	5	55
95	4	69	4	39
99	1	50	1	18
Total	100	73	100	73
<b>Native language</b>			0	
Finnish	94	73	92	73
Swedish	5	79	8	76
Other	0	52	0	63
Total	100		100	
<b>Living with a partner</b>				
No	26	60	49	65
Yes	74	77	51	81
Total	100		100	
<b>Gender</b>				
Man	50	71	38	78
Woman	50	75	62	70
Total	100		100	
Total (N)	254996	73	76968	73

Table A2. Number of days in hospital care from 1st January 1996 to 21st March 1999 in each percentile group.

Group	Number of days in hospital care	
	30-64-year-olds	65 and older
0-68	0	N/A
0-48	N/A	0
49-59	N/A	1-3
60-69	N/A	4-8
69/70-79	1-2	9-17
80-89	4-7	18-40
91-94	8-14	41-80
95-98	12-62	81-416
99-100	63+	417+

Table A3 Distributions of continuous health variables

	Percentile					
	25	50	75	90	95	99
<b>30-64-year-olds</b>						
Days in hospital care	0	0	2	8	15	63
Number of medicine packages bought	2	7	22	50	77	155
Cost of medicines (€)	20	114	511	1423	2265	5001
Sickness allowance days	0	0	0	21	61	281
<b>65 and older</b>						
Days in hospital care	0	1	13	41	81	422
Number of medicine packages bought	11	35	73	121	155	237
Cost of medicines (€)	198	831	1821	3088	4146	7204

Table A4 Prevalence of chronic conditions and turnout within each group (%)

	30–64-year-olds	65 or older
Arterial hypertension	17	48
Coronary artery disease	2	19
Atrial fibrillation	1	6
Cardiac insufficiency	0.5	11
Diabetes mellitus	2	8
Atherosclerosis	0.2	1
Cancer	1	5
COPD and asthma	9	14
Dementia	0.03	2
Depression	9	12
Parkinson's disease	0.2	1
Mental disorders	2	3
Renal insufficiency	0.05	0.1
At least one of the above	32	71
At least two of the above	11	36

Note: COPD: chronic obstructive pulmonary disease.

Table A5. Decomposition of total effect of social class (ref. unskilled manual) on voting in the 1999 parliamentary elections into direct effect and indirect effect via income deciles and days in hospital care percentiles (n: 254,568), 30–64-year-olds

	Lower non-manual		Upper non-manual		Self-employed	
	b	SE	b	SE	b	SE
Total effect	0.32	0.01	0.55	0.02	0.41	0.02
Direct effect	0.23	0.01	0.44	0.02	0.53	0.02
Indirect effect	0.09	0.01	0.12	0.01	-0.11	0.01
<b>Meditation percentages</b>						
Total	27.4		21.1		-27.7	
via income (ref. highest decile)						
2	-0.4		-1.0		0.4	
3	-0.8		0.1		1.8	
4	-1.8		0.9		2.8	
5	-2.3		1.7		3.7	
6	-1.6		3.1		3.9	
7	0.7		3.6		1.2	
8	4.7		5.6		-1.0	
9	11.5		6.7		-9.7	
10 (lowest)	16.6		-0.1		-31.0	
via days in hospital care percentile (ref. 0 days = 0-68 percentile)						
69-79	0.0		0.0		0.0	
81-89	-0.1		-0.1		0.0	
90-94	-0.1		0.0		0.0	
99-100	0.7		0.5		0.3	

Note: Models adjusted for education, gender, living with partner, native language, age and age squared.

Table A6. Decomposition of total effect of social class (ref. unskilled manual) on voting in the 1999 parliamentary elections into direct effect and indirect effect via income deciles and days in hospital care percentiles (n: 76,933), 65-year-olds or more

	Lower non-manual		Upper non-manual		Self-employed	
	b	SE	b	SE	b	SE
Total effect	0.47	0.02	0.73	0.05	0.33	0.02
Direct effect	0.29	0.02	0.54	0.05	0.48	0.02
Indirect effect	0.18	0.05	0.19	0.05	-0.15	0.05
<b>Meditation percentages</b>						
Total	38.7		25.7		-47.3	
via income decile (ref. Highest)						
2	-4.1		-1.7		2.3	
3	-4.3		0.5		5.4	
4	-0.8		2.7		8.7	
5	2.1		4.7		10.7	
6	5.3		7.1		10.8	
7	7.8		7.6		3.1	
8	7.8		4.9		-19.0	
9	9.2		3.3		-40.9	
10 (lowest)	11.2		-6.5		-26.5	
via days in hospital care percentile (ref. 0 days = 0-48 percentile)						
49-59	0.4		0.3		-0.3	
60-69	0.0		0.0		0.0	
69-79	0.1		-0.1		-0.1	
81-89	0.3		0.6		-0.9	
90-94	1.3		0.9		-0.6	
95-98	1.4		0.9		-0.8	
99-100	1.0		0.6		0.7	

Note: Models adjusted for education, gender, living with partner, native language, age and age squared.

Table A7. Decomposition of total effect of social class (ref. unskilled manual) on voting in the 1999 parliamentary elections into direct effect and indirect effect via different health indicators (n: 254,568), 30–64-year-olds

	Lower non-manual		Upper non-manual		Self-employed	
	b	SE	b	SE	b	SE
Total effect	0.32	0.01	0.54	0.02	0.39	0.01
Direct effect	0.31	0.01	0.54	0.02	0.39	0.01
Indirect effect	0.006	0.004	0.007	0.004	0.005	0.003
<b>Meditation percentages</b>						
Total	2.0		1.4		1.4	
via days in hospital care	0.8		0.5		0.5	
via amount of medicines purchased	0.0		-0.1		-0.1	
via cost of medicines purchased	0.3		0.4		0.4	
via sickness allowance days	0.3		0.3		0.3	
via arterial hypertension	0.0		0.0		0.0	
via coronary artery disease	0.0		0.0		0.0	
via atrial fibrillation	0.0		0.0		0.0	
via cardiac insufficiency	0.0		0.0		0.0	
via diabetes mellitus	0.1		0.0		0.0	
via atherosclerosis	0.0		-0.2		0.0	
via cancer	0.0		0.0		0.0	
via COPD and asthma	0.1		0.1		0.1	
via dementia	0.1		0.1		0.1	
via depression	-0.1		-0.2		-0.2	
via Parkinson's disease	0.0		0.0		0.0	
via mental disorders	0.5		0.3		0.2	
via renal insufficiency	0.0		0.0		0.0	

Notes: Models adjusted for education, gender, living with partner, native language, age and age squared.

COPD: chronic obstructive pulmonary disease.

Table A8. Decomposition of total effect of social class (ref. unskilled manual) on voting in the 1999 parliamentary elections into direct effect and indirect effect via different health indicators (n: 76,933), 65-year-olds or more

	Lower non-manual		Upper non-manual		Self-employed	
	b	SE	b	SE	b	SE
Total effect	0.48	0.02	0.73	0.05	0.31	0.02
Direct effect	0.45	0.02	0.71	0.05	0.31	0.02
Indirect effect	0.02	0.04	0.02	0.04	0.00	0.04
<b>Meditation percentages</b>						
Total	4.8		3.0		0.0	
via days in hospital care	2.1		0.9		-0.3	
via amount of medicines purchased	-0.2		-0.4		-0.5	
via cost of medicines purchased	0.7		1.0		0.8	
via arterial hypertension	0.0		0.0		0.0	
via coronary artery disease	-0.1		0.0		0.3	
via atrial fibrillation	0.0		0.0		0.0	
via cardiac insufficiency	0.4		0.3		-0.9	
via diabetes mellitus	0.7		0.4		-0.5	
via atherosclerosis	0.0		0.1		0.1	
via cancer	0.0		0.0		0.0	
via COPD and asthma	0.1		0.0		0.0	
via dementia	0.4		0.1		0.6	
via depression	-0.5		-0.7		0.3	
via Parkinson's disease	-0.1		0.1		-0.2	
via mental disorders	1.3		1.2		0.2	
via renal insufficiency	0.0		0.0		0.0	

Notes: Models adjusted for education, gender, living with partner, native language, age and age squared.

COPD: Chronic obstructive pulmonary disease.